Statement of Work for Performing Meteorological Measurements

Background: NASA and Gulfstream Aerospace Corporation are engaged in a joint flight test to measure and reduce the airframe noise component of aircraft noise. The acoustic measurements are to be conducted using (i) a ground-based NASA phased microphone array, (ii) Gulfstream certification microphones, and (iii) a sideline linear array. For proper execution of the airframe noise flight test, NASA will require meteorological (weather) measurements at the NASA Wallops Flight facility during the test. Frequent recording of the meteorological conditions (from ground level up to a height of 600 ft.) at the test site is required for several reasons. First, the temperature, velocity, and humidity profile measurements must be measured at the start of each test day to determine if suitable weather conditions exist for testing to commence. Second, once the flights begin during a given day, frequent recording of the meteorological conditions will allow close monitoring of unfavorable weather patterns (e.g., increasing wind gusts or temperature inversions) which may necessitate the flight test to be halted. Third, post-processing and analysis of the microphone data using established standards require the availability of temperature, velocity, and humidity data within one hour from the time that acoustic measurements are acquired.

There are specific requirements for the meteorological measurements that the contractor shall meet. These include the following:

- Availability of a tethered balloon/wench system with 4 sondes, each of which shall be capable of the simultaneous measurement of the wind velocity (accurate to within ± 0.3 m/s), the temperature (accurate to within ±1 deg. F), and the relative humidity (accurate to within ±1%).
- Availability of a senior researcher to lead the weather measurement effort during the entire duration of the flight test.
- Ability to superpose, in real time, the measured data on a temperature-humidity plot and instantly inform NASA personnel if favorable testing conditions are met.

The statement of work for the proposed task is described below.

Task 1 (Meteorological Measurements) – The contractor shall conduct meteorological measurements at the NASA Wallops Flight Facility (WFF) in support of the NASA-Gulfstream airframe noise flight test. The measured variables shall include temperature, two (streamwise and cross-stream) velocity components, and humidity, and shall be obtained using a tethered weather balloon. On each test day, the contractor shall be ready to conduct the meteorological survey no later than 15 minutes prior to the start of flights which will commence between 5:30am - 9:00am. All measurements shall be conducted by, or under the supervision of, a senior researcher with a minimum of 15 years of experience in making tethered balloon meteorological measurements and outdoor acoustic propagation. The senior researcher is to be present at the test site at all times during the flight testing days. Testing may occur on any days with favorable weather conditions, inclusive of weekends and holidays. However, consecutive flight days will be limited by FAA regulations governing the working hours of the flight and ground maintenance crews. The contractor shall provide all the necessary hardware (e.g., balloon, sensors, computers, etc.), software, and an appropriate level of staffing to enable acquisition of the atmospheric data in either of the following arrangements. In one setup, the contractor shall record temperature, velocity, and humidity profiles between the ground (3 ft.) and an altitude of 600 ft. using an ascending or descending tethered balloon. The recording shall occur at intervals of 20 ft. or smaller. Under this scenario, the meteorological survey shall be conducted on an hourly basis, or to be exact, 50 minutes from completion of the previous acquisition. In the alternative setup, the contractor shall use four measurement sensors stationed at the constant heights of 150 ft., 300 ft., 450 ft., and 600 ft. for simultaneous acquisition of temperature, two

velocity components, and humidity measurements. Under this setup, the contractor shall record the atmospheric data at 5 minute intervals. The contractor shall be informed by NASA on the evening prior to each testing day as to which measurement arrangement will be used for acquiring the meteorological data. In either setup, the contractor shall plot the recorded data in near real-time on the temperature-humidity chart, compare the measured velocities against allowable wind gusts, and inform designated NASA personnel whether the recorded conditions meet or exceed the appropriate range established by flight test requirements. NASA shall provide to the contractor the relevant criteria concerning the temperature-humidity boundaries and acceptable wind gust thresholds a week before the flight test. At the conclusion of each test day, which is likely to be around 11am but could extend into the early afternoon, the contractor shall transfer to NASA the full set of processed meteorological data obtained during the day and discuss any anomalies or unusual trends/patterns observed in the survey results. The wind velocity measurements shall be accurate to within ± 0.3 m/s. The temperature measurements shall be accurate to within ±1 deg. F. The relative humidity measurements shall be accurate to within ±1%.

Government Furnished Items (GFI)

Item	When Furnished
A gas burning generator to power the measurement sensors	Five days prior to commencement of flight test
Helium gas for the weather balloon	Five days prior to commencement of flight test and refills as needed during the test
One unskilled technician (OPTIONAL)	Five days prior to commencement of flight test for set up and on all flight days.

Deliverables

Deliverable	Due Date	Format
All processed meteorological measurements in an agreed upon format	On a daily basis at the end of each flight testing day	CDs and DVDs containing processed data, plots, and other supporting documentation
Measurement plan including expected uncertainties in the measurements, details of equipment, calibration strategy or report.	Within 3 weeks of award	Mutually agreed upon format (Word/powerpoint document)
Calibration report for instrumentation	July 30th 2014 or two weeks prior to commencement of flight test	Mutually agreed upon format (Word/powerpoint document)

Data Rights: The Government reserves the rights to all data measured under this task.

Required Travel: The contractor shall make provisions for travel to the NASA Wallops Flight Facility for the entire duration of the flight test.

Period of Performance: The contractor shall be on-site at Wallops Flight Facility for up to 33 contiguous days between August 14 and September 30. The contactor shall include a separate bid with a provision for a 7 day extension. The Government reserves the right whether or not to include the optional period in the final order.

Security: All work to be performed under this contract is unclassified.

Bid Options

Contractors shall submit bids for as many options as they can support.

Bid Designation	**Maximum Days on-site**	**Government Furnished Items Technician**
D33T0	33	None provided
D40T0	40	None provided
D33T1	33	One provided
D33T1	40	One provided